SONY

CINE ALTA™

SONY SR Projector

SRX-R110/SRX-R105

Breathtaking “4K” quality, high-resolution visuals wi
Cinema and large-venue applications.

th stunning 1800:1 contrast ratio for Digital

Sony is proud to introduce the SRX-R110 and SRX-R105 SR Ultra High Resolution Projectors.

These state-of-the-art projectors are equipped with three Silicon X-tal Reflective Display (SXRD™) imaging devices, delivering an amazing resolution of 4096 x 2160 pixels (H x V) – more than four times the resolution of full HDTV (1920 x 1080, 16:9 wide screen format) – and meeting the "4K" quality resolution level stipulated by Digital Cinema Initiative (DCI).

The SRX-R110 and the SRX-R105 offers a high contrast ratio of more than 1800:1. In addition, the SRX-R110 provides a high brightness of 10,000 ANSI lumens*, and the SRX-R105 a brightness of 5,000 ANSI lumens*.

The use of twin Xenon lamps combined with a gamma curve of 2.6 – (also recommended by DCI as the standard for Digital Cinema) – means the SRX-R110 and the SRX-R105 offer pure, high-quality color tonal reproduction reminiscent of film.

Even in a multi-screen mode, high-resolution visuals are available from each quadrant. The SRX-R110 and the SRX-R105 Projectors are the ideal choice for Digital Cinema and large-venue applications such as auditoriums and concert halls.

* ANSI lumens is a measuring method of the American National Standards Institute IT 7.228. Since there is no uniform method of measuring brightness, specifications will vary among manufacturers.

CineAlta™ – Innovative Solutions for Digital Cinema

In 1999, Sony introduced a totally new concept of digital cinema production for moviemakers to demonstrate a new higher level of picture quality, efficiency and flexibility in production processes. Sony's new approach was to produce movies in a high-definition progressive video format at 24 frames per second using digital video tape media. This concept and Sony's product line enabling this concept were named "CineAlta", and have been highly embraced by an ever-broadening spectrum of producers, directors and cinematographers all over the world. An increasing number of movies have been produced using CineAlta equipment, and from this point forward, more and more motion pictures will continue to be produced digitally using these systems.

Since this revolutionary introduction, Sony has continually provided a comprehensive range of CineAlta products including digital video cameras, digital VTRs, monitors and digital editing systems -- each offering breathtaking picture quality and stunning performance. Sony's development for the motion picture industry does not remain in the content creation domain, but continues with another important revolution by engineering an incredibly high, 4K- resolution digital projection system under the CineAlta logo.

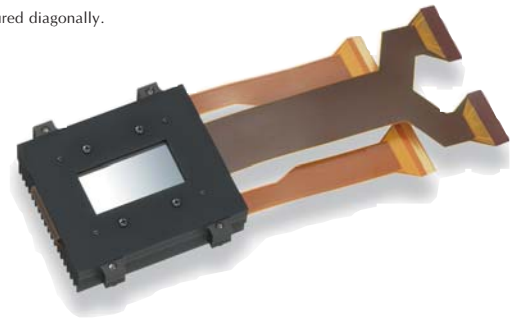
Now Sony's CineAlta lineup consists of products from acquisition through theatrical projection Sony's CineAlta 4K digital projector is the latest, but most important piece of the "Digital Cinema" picture.

The state-of the-art techno

Silicon X-tal Reflective Display (SXRD) imaging device

The SXRD device used by the SRX-R110 and SRX-R105 is a 1.55-inch* Liquid Crystal on Silicon based imager developed using leading-edge manufacturing technology. High-quality, accurate visuals are created using this brilliant imaging device.

*Measured diagonally.



High resolution "4K"

Sony original SXRD display devices deliver the exceptionally high resolution of "4K" (4096 H x 2160 V pixels at 1.85:1 aspect ratio). "4K" is stipulated by DCI as a resolution corresponding to the master images of 65mm film for Digital Cinema. The resolution of "4K" is more than four times as many pixels as full HDTV (1920 x 1080, 16:9 wide screen format). "4K" resolution is ideal for visual applications in which quality is critical.

The SXRD device helps to achieve this high picture quality by incorporating nearly 8.85 million pixels per imager at a narrow pitch of 8.5 micrometers. These high-density pixels enable an outstandingly high-resolution that are half the size of pixels projected using typical 2K resolution projection systems. Even in multi-screen mode, full 2K resolution per quadrant is possible.

High 1800:1 contrast ratio

The SRX-R110 and the SRX-R105 offer a high contrast ratio of more than 1800:1* through the use of Sony's unique new SXRD device. The SXRD imaging device itself achieves a contrast ratio of 4000:1.

This stunning picture quality makes the SRX-R110 and SRX-R105 ideal for applications in which dynamic range is essential.

The high contrast ratio has been achieved through two key technologies – the 'Vertically Aligned Liquid Crystal' system and an extremely thin liquid crystal cell gap.

*The contrast ratio is measured under the condition that projection is on the screen with a screen gain of 1.0.

Vertically Aligned Liquid Crystal system

In every type of projector system, displaying absolute black is a major issue in order to achieve a high contrast ratio. In other words, the contrast ratio of a projector depends on how effectively the light from the source can be blocked so it does not leak through the LCD device.

All Liquid Crystal Display (LCD) devices control the amount of light to be projected by applying an electric field to the liquid crystal gap. In typical LCD devices, black is produced when electric field is applied across the liquid crystal cell gap. However molecules near the surface of the glass substrate may not be accurately controlled due to the influence of the alignment film. This is not an issue for bright images. However, when displaying dark black images, light can tend to leak from the LCD device, since the molecules near the surface are less accurately controlled, resulting in a creamy black color.

The SXRD device does not exhibit these characteristics. This is because the Vertically Aligned Liquid Crystal system displays black when an electric field is not applied and because all molecules are in the correct alignment to block light. The direct result is a far deeper black level, leading to a high contrast ratio.

Thin liquid crystal cell gap

Another important factor enabling the high contrast of the SXRD device is its ultra thin cell gap of less than 2 micrometers. With conventional Vertically Aligned Liquid Crystal systems, a thin cell gap could not be achieved. Sony has overcome this difficulty through the use of innovative planarization technology in the silicon backplane structure and an advanced Silicon wafer-based assembly process.

The SXRD device also adopts a structure that does not use "spacers" - columns found in conventional reflective liquid crystal devices to maintain a constant gap between the liquid cell floor and the top of the device. Spacers tend to both scatter and reflect light, which can impair high contrast pictures. In the spacerless SXRD device, these artifacts are no longer seen.

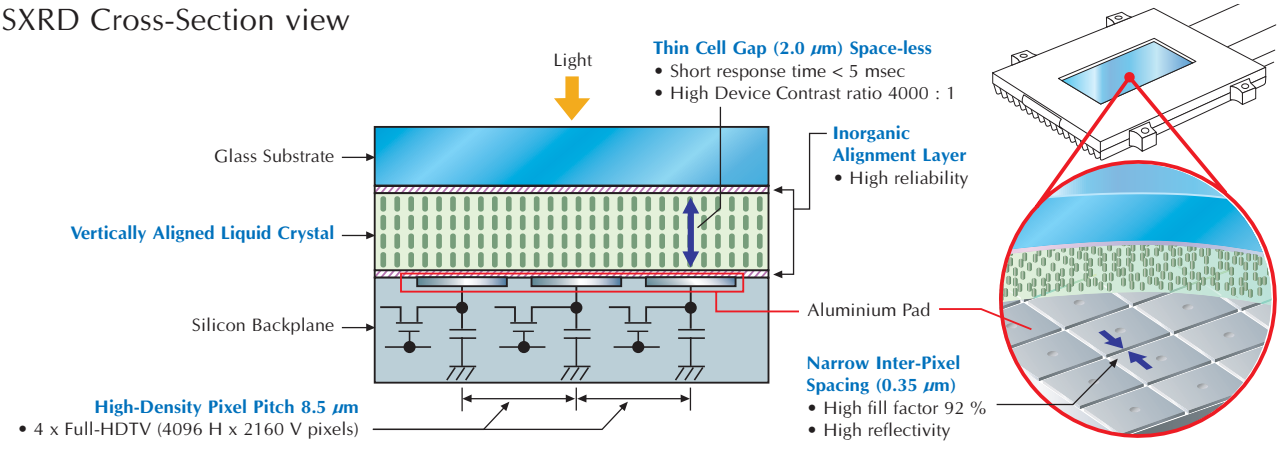
Short response time

The thin cell gap structure in SXRD devices also contributes to an ultra-short response time of 5 milliseconds. The SXRD device reacts promptly to the instantaneous change of colors, enabling the projector to display a smooth motion. Consequently, the SRX-R110 and SRX-R105 are free from motion blur – a particularly significant benefit for visuals that include fast-moving objects.

Reliable imaging device

The SRX-R110 and the SRX-R105 use high-power bright lamps. As a result special attention has been paid to the reliability of the SXRD device. The inorganic materials utilized for the alignment layer of the SXRD device are resistant to deterioration or deformities that could occur due to the intense heat and light generated by the powerful projector lamp.

SXRD Cross-Section view



Highly pure, superb color tonal reproduction

Highly bright and pure light source of Xenon lamp

The SRX-R110 provides a high brightness of 10,000 ANSI lumens*, and the SRX-R105 provides a brightness of 5,000 ANSI lumens using Xenon lamps.
A Xenon lamp provides pure, superb color tonal reproduction as it has been used for film projector - essential for Digital Cinema.
The SRX-R110 utilizes two 2kW Xenon lamps, and the SRX-R105 uses two 1kW Xenon lamps.
The Xenon lamp utilized in the SRX-R110 and the SRX-R105 satisfies the wide color range needed for Digital Cinema Distribution Master (DCDM) formats stipulated by DCI.

*Measured under conditions with the lamp power at 100% in dual-lamp mode.

12-bit LCD driver

The SRX-R110 and the SRX-R105 utilize a 12-bit imager driver for reproducing extremely natural images.

Gamma curve selection

The SRX-R110 and the SRX-R105 provide three preset gamma curve values. You can select an optimum value from 1.8, 2.2, and 2.6 according to the desired color tone. The value 2.6 is available for Digital Cinema applications.

Operational versatility

Dual-lamp system with selectable lamp modes

The SRX-R110 and SRX-R105 adopt a dual-lamp system that uses two lamps for reliable, flexible and efficient use of light sources. With the dual-lamp system, users can select either single- or dual-lamp modes according to their desired brightness and applications.

The dual-lamp mode provides maximum lamp power, and at the same time enables virtually fail-safe operation; if one bulb burns out the other can keep projecting images.

In the single-lamp mode, users can select any of two lamps manually, or the projectors can automatically select a lamp based on each lamp's operating time. Another automatic mode is provided to make the lamps operate alternately at user-defined intervals selectable from four hours to twelve hours (in increments of one hour). This feature is useful for the application where "24/7" operation is required.

The lamp power can be set between 100% and 51%, in eight steps. This function combined with the selectable lamp modes contributes to achieving longer lamp life.

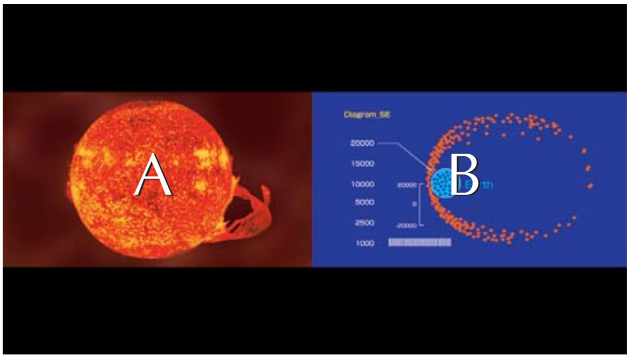
Variety of lenses

Four types of optional zoom lens are available. They are all newly designed to project images of extreme resolution and contrast with minimal chromatic aberration from 174 inches (4,428 mm) to 610 inches (15,497 mm) in screen width.

Multiple screen capability

Both the SRX-R110 and SRX-R105 provide single-mode, dual-mode, and quad-mode display. In quad mode, four quadrants of full HD images (1920 x 1080 pixels) can be projected simultaneously. In single mode, an ultra high and smooth resolution 4096 x 2160-pixel image is projected.

Single-mode



Dual-mode

Quad-mode

Four option slots

LKRI-001
Analog Input Board

LKRI-002
HD-SDI (4:2:2) Input Board

LKRI-003
Dual-link HD-SDI Input Board

Input signal flexibility

Four option slots are available to increase the flexibility of the SRX-R110 and the SRX-R105 by using three types of option boards that connect to different types of signal formats.
Four input boards can be accommodated simultaneously in the side panel of the projector. You can select the screen mode from single, dual, and quad mode, and assign the appropriate signal board to each quadrant.

- The LKRI-001 Analog Input Board utilizes 5 BNC connectors that can accept 0.7 volt analog signal levels.
- The LKRI-002 HD-SDI (4:2:2) Input Board can accept SMPTE 259M SD digital 525 or 625 line video.
  It can auto switch to either SMPTE 292M 1080 4:2:2 YUV serial picture data or SMPTE 372M 4:2:2 RGB serial picture data.
- The LKRI-003 Dual-link HD-SDI Input Board can accept any of the following signals: SMPTE 372M dual-link HD-SDI (4:4:4), SMPTE 292M HD-SDI (4:2:2), dual-link DC-SDI (RGB 4:4:4), or DC-SDI (YPbPr 4:2:2).
  With four LKRI-003 boards, the SRX-R110 or SRX-R105 can project 4096 x 2160 4k images.

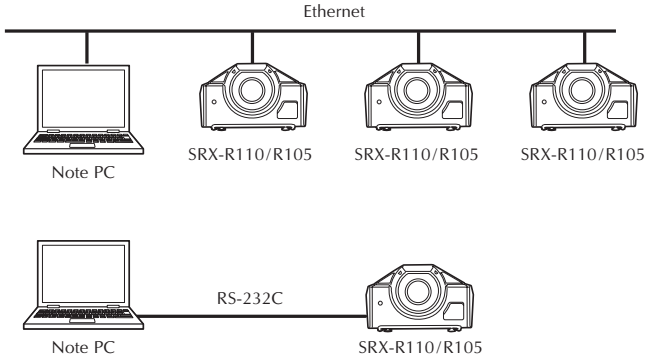
Simple remote controller unit

The supplied remote controller unit is provided to perform various simple controls of the projectors such as turning on/off lamp power, adjusting zoom/focus and lens shift control.

Easy setup on a PC using supplied software

The SRX-R110 and SRX-R105 come equipped with setup software that allows easy setup and adjustments via its intuitive GUIs on a PC*. These projectors can be controlled through Ethernet or RS-232C interface, and multiple numbers of projectors can be controlled from a single PC**.
A comprehensive range of setup parameters including input configurations, colorimetry controls, installation adjustments and maintenance settings can be controlled via this software.

* System requirements for the setup software
OS: Microsoft® Windows® XP Professional.
** When using an Ethernet connection.



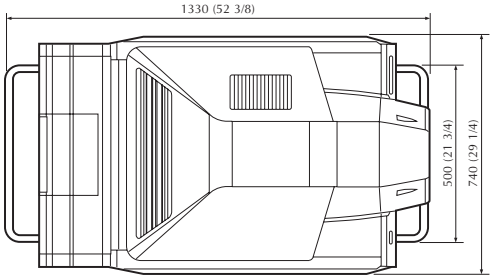
Installation setting

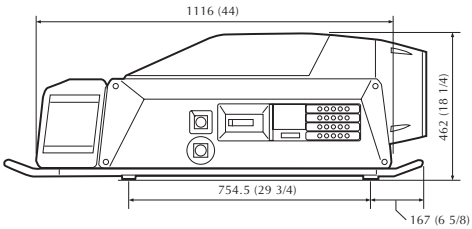
Easy maintenance

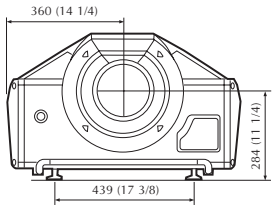
Special consideration for maintenance issue is taken into the development of these projectors to effectively perform periodic maintenance.
Lamp bulbs and lamp house units used in the projectors can be easily replaced on site without any special tools, thus shortening the downtime required for the replacement. What's more, a cumbersome adjustment after the replacement is not required.
The supplied setup software is another convenient tool for maintenance. This allows operators to easily verify lamp's operating time. Automatic email alerts from the projector provides operators with maintenance reminders as well as error occurrences.

Colorimetry setting

Dimensions







Unit=mm (inches)

Optional Accessories

LKRL-Z115 Zoom Lens
1.5 to 1.9*x zoom lens

LKRL-Z120 Zoom Lens
1.9 to 2.3x zoom lens

LKRL-Z125 Zoom Lens
2.3 to 4.0x zoom lens

LKRL-Z140 Zoom Lens
4.0 to 7.0x zoom lens

*The number denotes the ratio of the projection distance to the screen width.

LKRI-001 Analog Input Board

LKRI-002 HD-SDI (4:2:2) Input Board

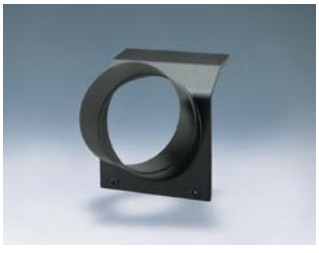
LKRI-003 Dual-link HD-SDI Input Board

LKRX-105
1kW Xenon lamp bulb for replacement (for SRX-R105)

LKRX-B105
1kW Xenon lamp house unit for replacement (for SRX-R105)

LKRX-110
2kW Xenon lamp bulb for replacement (for SRX-R110)

LKRX-B110
2kW Xenon lamp house unit for replacement (for SRX-R110)



LKRA-001
8-inch Exhaust Duct Adaptor

Specifications

SXRD Device Main Specifications	
Display device	SXRD (Silicon X-tal Reflective Display)
Size	1.55" across Diagonal
Resolution	4096(H) X 2160(V) Pixels
Reflectivity	72%
Contrast (as device)	More than 4000 : 1
Pixel pitch	8.5μm
Width (between pixels)	0.35μm
Response speed	5msec (tr + tf)
Liquid crystal mode	Vertical Aligned Mode
Alignment layer	Inorganic Thin Film
Backplane process	0.35μm MOS Process
Liquid crystal cell gap	Less than 2μm

Optical			
Projection system	3-SXRD panel, prism color integrated system		
Imaging device	SXRD, 1.55-inch (diagonal), 4096(H) x 2160(V) pixels on each chip		
Lamp	2kW Xenon lamp x 2 (SRX-R110)		
	1kW Xenon lamp x 2 (SRX-R105)		
Screen coverage	14 feet to 51 feet (Approx. 4.5 m to 15.5 m) (viewable area, measured horizontally)		
Light output	10,000 ANSI lumens ±10% (SRX-R110)*		
	5,000 ANSI lumens ±10% (SRX-R105)		
General			
White reference	Xenon white reference		
		X	Y
	White reference	0.3140	0.3510
Contrast	more than 1800:1		
Resolution	600 TV lines (SDI input/SMPTE-259M)		
	1920 x 1080 pixels (HD-SDI input, SMPTE-292M)		
	4096 x 2160 pixels (RGB)		
Signal specifications	Video: Component (Y・Cb・Cr), HD (G・B・R/Y・Pb・Pr) Computer: XGA, SXGA, UXGA		
Power requirements	AC 200 to 240 V, 50/60 Hz (SRX-R110)		
	AC 100 to 240 V, 50/60 Hz (SRX-R105)		
Operating temperature	+5°C to +35°C (+41°F to +90°F)		
Storage temperature	-20°C to +60°C (12°F to +140°F)		
Operating humidity	35% to 85% (without condensation)		
Storage humidity	10% to 90%		
Dimensions (W x H x D)	Approx. 740 x 500 x 1330mm (29 4/5 x 19 4/5 x 52 3/5 inches)		
Mass	Approx. 110 kg (242 lb 8oz)		
Input/Output			
Input A	Open for optional signal interface board		
Input B	Open for optional signal interface board		
Input C	Open for optional signal interface board		
Input D	Open for optional signal interface board		
Remote interface	D-sub 9-pin, RS-232C (female) x 1		
	Ethernet terminal, 10Base-T/100Base-TX x 1		

*ANSI lumens is a measuring method of the American National Standards Institute.

Input Boards			
LKRI-001 Analog input board	BNC x 5, HD/SD analog video input, RGB/Y・Cb・Cr selectable		
	Computer signals		
		R	0.7 Vp-p ±2dB positive, 75 Ω
		G	0.7 Vp-p ±2dB positive, 75 Ω
		B	0.7 Vp-p ±2dB positive, 75 Ω
	Standard definition video [Y・Cb・Cr]		
		Y	1.0 Vp-p ±2dB sync negative, 75 Ω
		Cb	0.7 Vp-p ±2dB positive, 75 Ω
		Cr	0.7 Vp-p ±2dB positive, 75 Ω
	High definition video [RGB]		
		R	0.7 Vp-p ±2dB positive, 75 Ω
		G with sync	1.0 Vp-p ±2dB, 75 Ω, Tri-level sync: ±0.3 Vp-p / Bi-level sync: 0.3 Vp-p
		B	0.7 Vp-p ±2dB positive, 75 Ω
	High definition video [Y・Pb・Pr]		
		Y	1.0 Vp-p ±2dB, 75 Ω,Tri-level sync: ±0.3 Vp-p / Bi-level sync: 0.3 Vp-p
		Pb	±0.35 Vp-p ±2dB, positive 75 Ω
		Pr	±0.35 Vp-p ±2dB, positive 75 Ω
	Sync		
		HD Horizontal	TTL level, high impedance, sync positive/negative
		HD Vertical	TTL level, high impedance, sync positive/negative
LKRI-002 HD-SDI (4:2:2) input board	BNC x 2(Input x 1,Loop-through out x 1) HD-SDI (SMPTE-292M / ITU-R.BT709 / BTA-S004) SDI (SMPTE-259M / ITU-R.BT601)		
LKRI-003 Dual-link HD-SDI input board	BNC x 4(Input x 2,Loop-through out x 2) HD-SDI (Single-link, HD-SDI/4:2:2,SMPTE-292M):Y・Pb・Pr, DC-SDI (Single-link, DC-SDI/4:2:2):Y・Pb・Pr, Dual-link HD-SDI (Dual-link HD-SDI/4:4:4,SMPTE-372M):RGB, Dual-link DC-SDI (Dual-link DC-SDI/4:4:4):RGB		
Others			
Safety regulations	[UL60950 listed], [cUL60950], [FCC Class A], [IC Class A], [VCCI Class A], [EN60950],[CE Class A], [C-tick], [GB4943], [GB9254], [K60950], [CISPR22], [CISPR24]		
Supplied accessories	Remote controller x 1/ CD-ROM x 1 (Remote control application for Windows® XP Professional Edition) / Dry cell (AA size) x 2 / Ethernet Cross Cable (3 m) x 1		
	Operation instructions x 1 / Installation manual x 1		
Optional accessories	LKRL-Z115: 1.5 to 1.9x zoom lens		
	LKRL-Z120: 1.9 to 2.3x zoom lens		
	LKRL-Z125: 2.3 to 4.0x zoom lens		
	LKRL-Z140: 4.0 to 7.0x zoom lens		
	LKRI-001: Analog input board		
	LKRI-002: HD-SDI (4:2:2) input board		
	LKRI-003: Dual-link HD-SDI input board		
	LKRX-105: 1kW Xenon lamp bulb for replacement (for SRX-R105)		
	LKRX-B105: 1kW Xenon lamp house unit for replacement (for SRX-R105)		
	LKRX-110: 2kW Xenon lamp bulb for replacement (for SRX-R110)		
	LKRX-B110: 2kW Xenon lamp house unit for replacement (for SRX-R110)		
	LKRA-001: 8-inch Exhaust Duct adaptor		

Preset Data of Input Signals

No	Signal Number	fH	fV	Aspect	Horizontal Sampling	Vertical Sampling
0	NO INPUT	0	0			
3	VIDEO60(480_60I)	15.73 kHz	59.94 kHz	4:3	1280	480
4	VIDEO50(575_50I)	15.63 kHz	50.00 kHz	4:3	1280	570
5	HDTV(1080_60I)	33.75 kHz	60.00 kHz	16:9	1920	1080
23	1024 x 768_VESA60	48.36 kHz	60.00 kHz	4:3	1024	768
24	1024 x 768_VESA70	56.48 kHz	70.07 kHz	4:3	1024	768
25	1024 x 768_VESA75	60.02 kHz	75.03 kHz	4:3	1024	768
26	1024 x 768_VESA85	68.68 kHz	85.00 kHz	4:3	1024	768
32	1280 x 960_VESA60	60.00 kHz	60.00 kHz	4:3	1280	960
33	1280 x 960_VESA75	75.00 kHz	75.00 kHz	4:3	1280	960
36	1280 x 1024_VESA60	63.97 kHz	60.01 kHz	5:4	1280	1024
37	11280 x 1024_VESA75	79.98 kHz	75.03 kHz	5:4	1280	1024

No	Signal Name	fH	fV	Aspect	Horizontal Sampling	Vertical Sampling
38	1280 x 1024_VESA85	91.15 kHz	85.02 kHz	5:4	1280	1024
39	1600 x 1200_VESA60	75.00 kHz	60.00 kHz	4:3	1600	1200
45	1080_50I	31.25 kHz	50.00 kHz	16:9	1920	1080
47	720_60P	45.00 kHz	60.00 kHz	16:9	1280	720
48	720_50P	37.50 kHz	50.00 kHz	16:9	1280	720
49	1080_48I (24PsF)	27.00 kHz	48.00 kHz	16:9	1920	1080
(75)	1080_60i	33.75 kHz	60.00 kHz	16:9	1920	1080
(76)	1080_25PsF	31.25 kHz	50.00 kHz	16:9	1920	1080
(77)	1080_30PsF	33.75 kHz	60.00 kHz	16:9	1920	1080

Note:*When a signal other than the preset signals shown above is fed into this projector, the images may not be projected properly.
*SXGA+(1400 x 1050) computer signal is not supported by this projector. If this signal is fed into the projector, one of the four directions of an image are irregularly missing.

SONY

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CINE ALTA

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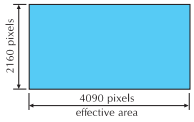
SR projector SRX-R110/SRX-R105

Installation Data (Installation chart)

LKRL-Z115 Zoom Lens

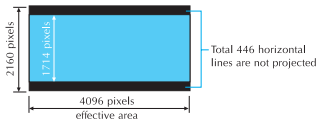
In case of [4096]-horizontal pixels (A) Full Screen Projection – 4096(H) pixels x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.527344	2380	2640	3170	3700	4220	4750	5280	6330	7390
Diagonal Screen Size [SS] SS = W x 1.130527	5090 (200.4)	5660 (222.8)	6790 (267.3)	7920 (311.8)	9050 (356.3)	10180 (400.8)	11310 (445.3)	13570 (534.3)	15830 (623.2)
Throwing distance [min.] = W x 1.493566 – 64.0	6610	7410	8900	10400	11890	13380	14880	17860	20850
Throwing distance [max.] = W x 1.749196 – 60.1	7810	8680	10430	12180	13930	15680	17430	20930	24420



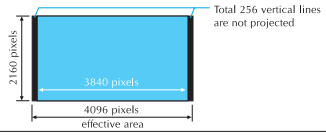
In case of [4096]-horizontal pixels (B) Cinemascope (2.39:1) Projection – 4096(H) x 1714(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.418457	1890	2100	2520	2930	3350	3770	4190	5030	5860
Diagonal Screen Size [SS] SS = W x 1.084023	4880 (192.1)	5430 (213.8)	6510 (256.3)	7590 (298.8)	8680 (341.7)	9760 (384.3)	10850 (427.2)	13010 (512.2)	15180 (597.6)
Throwing distance [min.] = W x 1.493566 – 64.0	6660	7410	8900	10400	11890	13380	14880	17860	20850
Throwing distance [max.] = W x 1.749196 – 60.1	7810	8680	10430	12180	13930	15680	17430	20930	24420



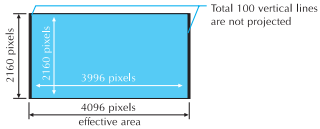
In case of [3840]-horizontal pixels (A) 16:9 Projection – 3840(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.562500	2540	2820	3380	3940	4500	5070	5630	6750	7880
Diagonal Screen Size [SS] SS = W x 1.147347	5170 (203.6)	5740 (226)	6890 (271)	8040 (316.5)	9180 (361.4)	10330 (406.7)	11480 (452)	13770 (542.1)	16070 (632.7)
Throwing distance [min.] = W x 1.593137 – 64.0	7110	7910	9500	11090	12690	14280	15870	19060	22240
Throwing distance [max.] = W x 1.865809 – 60.1	8330	9260	11130	13000	14860	16730	18590	22320	26060



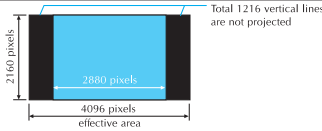
In case of [3996]-horizontal pixels (B) Vista Vision (1.85:1) Projection – 3996(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.540541	2440	2710	3250	3790	4330	4870	5410	6490	7570
Diagonal Screen Size [SS] SS = W x 1.136743	4110 (161.8)	4570 (179.9)	5480 (215.7)	6390 (251.6)	7310 (287.8)	8220 (323.6)	9130 (359.4)	10960 (431.5)	12780 (503.1)
Throwing distance [min.] = W x 1.530943 – 64.0	6830	7600	9130	10660	12190	13720	15250	18310	21370
Throwing distance [max.] = W x 1.792969 – 60.1	8000	8900	10690	12490	14280	16070	17860	21450	25040



In case of [2880]-horizontal pixels (A) 4:3 Projection – 2880(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.750000	3380	3750	4500	5250	6000	6750	7500	9000	10500
Diagonal Screen Size [SS] SS = W x 1.250000	5630 (221.7)	6250 (246.1)	7500 (295.3)	8750 (344.5)	10000 (393.7)	11250 (443)	12500 (492.1)	15000 (590.6)	17500 (689)
Throwing distance [min.] = W x 2.124183 – 64.0	9500	10560	12690	14810	16930	19060	21180	25430	29680
Throwing distance [max.] = W x 2.487745 – 60.1	11130	12370	14860	17350	19840	22320	24810	29790	34760

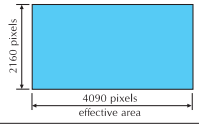


∗Effective area of projector LCD device

LKRL-Z120 Zoom Lens

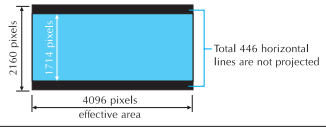
In case of [4096]-horizontal pixels (A) Full Screen Projection – 4096(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.527344	2380	2640	3170	3700	4220	4750	5280	6330	7390
Diagonal Screen Size [SS] SS = W x 1.130527	5090 (200.4)	5660 (222.8)	6790 (267.3)	7920 (311.8)	9050 (356.3)	10180 (400.8)	11310 (445.3)	13570 (534.6)	15830 (623.2)
Throwing distance [min.] = W x 1.749196 – 77.1	7800	8670	10420	12170	13920	15670	17420	20920	24420
Throwing distance [max.] = W x 2.312155 – 119.5	10280	11440	13750	16060	18370	20680	23000	27620	32250



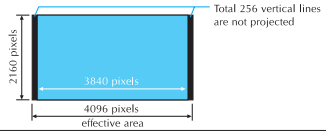
In case of [4096]-horizontal pixels (B) Cinemascope (2.39:1) Projection – 4096(H) x 1714(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.418547	1890	2100	2520	2930	3350	3770	4190	5030	5860
Diagonal Screen Size [SS] SS = W x 1.084023	4880 (192.1)	5430 (213.8)	6510 (256.3)	7590 (298.8)	8680 (341.7)	9760 (384.3)	10850 (427.2)	13010 (512.2)	15180 (597.6)
Throwing distance [min.] = W x 1.749196 – 77.1	7800	8670	10420	12170	13920	15670	17420	20920	24420
Throwing distance [max.] = W x 2.312155 – 119.5	10280	11440	13750	16060	18370	20680	23000	27620	32250



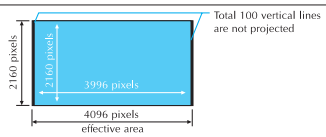
In case of [3840]-horizontal pixels (A) 16:9 Projection – 3840(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.562500	2540	2820	3380	3940	4500	5070	5630	6750	7880
Diagonal Screen Size [SS] SS = W x 1.147347	5170(203.5)	5740(226)	6890(271.3)	8040(316.5)	9180(361.4)	10330(406.7)	11480(452)	13770(542.1)	16070(632.7)
Throwing distance [min.] = W x 1.865809 – 77.1	8320	9260	11120	12990	14850	16720	18590	22320	26050
Throwing distance [max.] = W x 2.466299 – 119.5	10970	12210	14670	17140	19610	22070	24540	29470	34400



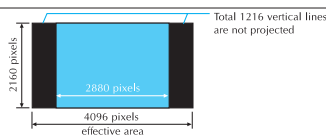
In case of [3996]-horizontal pixels (B) Vista Vision (1.85:1) Projection – 3996(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.540541	2440	2710	3250	3790	4330	4870	5410	6490	7570
Diagonal Screen Size [SS] SS = W x 1.136743	4110(161.8)	4570(179.9)	5480(215.7)	6390(251.6)	7310(287.8)	8220(323.6)	9130(359.4)	10960(431.5)	12780(503.1)
Throwing distance [min.] = W x 1.792969 – 77.1	8000	8890	10690	12480	14270	16060	17860	21440	25030
Throwing distance [max.] = W x 2.370017 – 119.5	10540	11730	14100	16470	18840	21210	23580	28320	33060



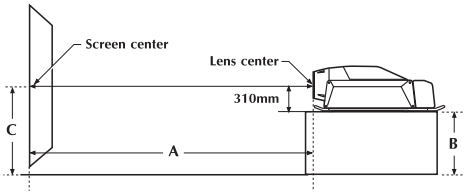
In case of [2880]-horizontal pixels (A) 4:3 Projection – 2880(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.750000	3380	3750	4500	5250	6000	6750	7500	9000	10500
Diagonal Screen Size [SS] SS = W x 1.250000	5630(221.7)	6250(246.1)	7500(295.3)	8750(344.5)	10000(393.7)	11250(443)	12500(492.1)	15000(590.6)	17500(689)
Throwing distance [min.] = W x 2.487745 – 77.1	11120	12370	14850	17340	19830	22320	24810	29780	34760
Throwing distance [max.] = W x 3.288399 – 119.5	14670	16320	19610	22890	26180	29470	32760	39340	45910



∗Effective area of projector LCD device

SONY

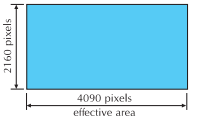


A: Distance from the screen center and the lens center
= See "Projection throw chart"
B: Height of a projector stand
B = C - 310mm
Minimum: Pile up the lowest end of the screen and the lens center
Maximum: Pile up the top end of the screen and the lens center
C: Distance from floor to the center of the screen = Free

LKRL-Z125 Zoom Lens

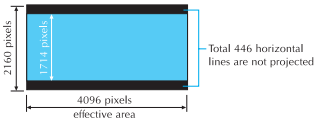
In case of [4096]-horizontal pixels (A) Full Screen Projection – 4096(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.527344	2380	2640	3170	3700	4220	4750	5280	6330	7390
Diagonal Screen Size [SS] SS = W x 1.130527	5090 (200.4)	5660 (222.8)	6790 (267.3)	7920 (312)	9050 (356.3)	10180 (400.8)	11310 (445.3)	13570 (534.3)	15830 (623.2)
Throwing distance [min.] = W x 2.312155 – 97.5	10310	11470	13780	16090	18400	20720	23030	27650	32280
Throwing distance [max.] = W x 3.797105 – 161.8	16920	18820	22620	26410	30210	34010	37800	45400	52990



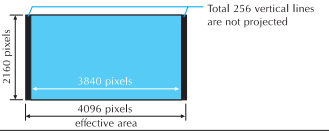
In case of [4096]-horizontal pixels (B) Cinemascope (2.39:1) Projection – 4096(H) x 1714(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.418457	1890	2100	2520	2930	3350	3770	4190	5030	5860
Diagonal Screen Size [SS] SS = W x 1.084023	4880(192.1)	5430 (213.8)	6510 (256.3)	7590 (298.8)	8680 (341.7)	9760 (384.3)	10850 (427.2)	13010 (512.2)	15180 (597.6)
Throwing distance [min.] = W x 2.312155 – 97.5	10310	11470	13780	16090	18400	20720	23030	27650	32280
Throwing distance [max.] = W x 3.797105 – 161.8	16920	18820	22620	26410	30210	34010	37800	45400	52990



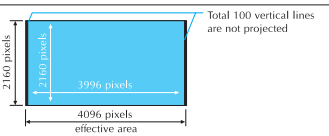
In case of [3840]-horizontal pixels (A) 16:9 Projection – 3840(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.562500	2540	2820	3380	3940	4500	5070	5630	6750	7880
Diagonal Screen Size [SS] SS = W x 1.147347	5170(203.5)	5740 (226)	6890 (271.3)	8040 (316.5)	9180 (361.4)	10330 (406.7)	11480 (452)	13770 (542.1)	16070 (632.7)
Throwing distance [min.] = W x 2.466299 – 97.5	11010	12240	14710	17170	19640	22100	24570	29500	34440
Throwing distance [max.] = W x 4.050245 – 161.8	18060	20080	24130	28180	32240	36290	40340	48440	56540



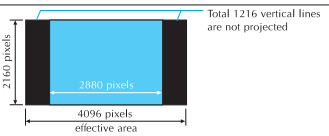
In case of [3996]-horizontal pixels (B) Vista Vision (1.85:1) Projection – 3996(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.540541	2440	2710	3250	3790	4330	4870	5410	6490	7570
Diagonal Screen Size [SS] SS = W x 1.136743	4110(161.8)	4570 (179.9)	5480 (215.7)	6390 (251.6)	7310 (287.8)	8220 (323.6)	9130 (359.4)	10960 (431.5)	12780 (503.1)
Throwing distance [min.] = W x 2.370017 – 97.5	10570	11760	14130	16500	18870	21240	23610	28350	33090
Throwing distance [max.] = W x 3.892127 – 161.8	17350	19290	23190	27080	30970	34860	38750	46540	54320



In case of [2880]-horizontal pixels (A) 4:3 Projection – 2880(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.750000	3380	3750	4500	5250	6000	6750	7500	9000	10500
Diagonal Screen Size [SS] SS = W x 1.250000	5630 (221.7)	6250 (246.1)	7500 (295.3)	8750 (344.5)	10000 (393.7)	11250 (443)	12500 (492.1)	15000 (591)	17500 (689)
Throwing distance [min.] = W x 3.288399 – 97.5	14710	16350	19640	22930	26210	29500	32790	39370	45950
Throwing distance [max.] = W x 5.400327 – 161.8	24130	26830	32240	37640	43040	48440	53840	64640	75440

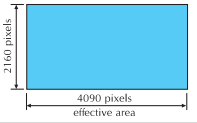


*Effective area of projector LCD device

LKRL-Z140 Zoom Lens

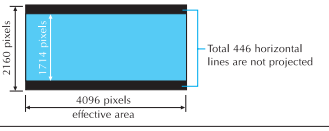
In case of [4096]-horizontal pixels (A) Full Screen Projection – 4096(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.527344	2380	2640	3170	3700	4220	4750	5280	6330	7390
Diagonal Screen Size [SS] SS = W x 1.130527	5090 (200.4)	5660 (222.8)	6790 (267.3)	7920 (311.8)	9050 (356.3)	10180 (400.8)	11310 (445.3)	13570 (534.3)	15830 (623.2)
Throwing distance [min.] = W x 3.797105 – 122.8	16970	18870	22660	26460	30260	34060	37850	45450	53040
Throwing distance [max.] = W x 6.979550 – 169.0	31230	34720	41700	48680	55660	62640	69620	83580	97540



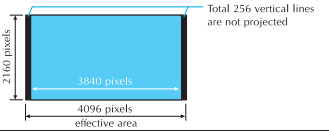
In case of [4096]-horizontal pixels (B) Cinemascope (2.39:1) Projection – 4096(H) x 1714(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.418457	1890	2100	2520	2930	3350	3770	4190	5030	5860
Diagonal Screen Size [SS] SS = W x 1.084023	4880 (192.1)	5430 (213.4)	6510 (256)	7590 (298.8)	8680 (341.3)	9760 (383.9)	10850 (426.8)	13010 (511.8)	15180 (597.2)
Throwing distance [min.] = W x 3.797105 – 122.8	16970	18870	22660	26460	30260	34060	37850	45450	53040
Throwing distance [max.] = W x 6.979550 – 169.0	31230	34720	41700	48680	55660	62640	69620	83580	97540



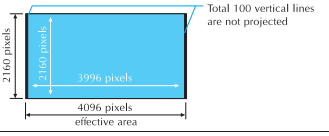
In case of [3840]-horizontal pixels (A) 16:9 Projection – 3840(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.562500	2540	2820	3380	3940	4500	5070	5630	6750	7880
Diagonal Screen Size [SS] SS = W x 1.147347	5170 (203.5)	5740 (226)	6890 (271.3)	8040 (316.5)	9180 (361.4)	10330 (406.7)	11480 (452)	13770 (542.1)	16070 (632.7)
Throwing distance [min.] = W x 4.050245 – 122.8	18110	20130	24180	28230	32280	36330	40380	48490	56590
Throwing distance [max.] = W x 7.444853 – 169.0	33330	37050	44500	51940	59380	66830	74270	89160	104050



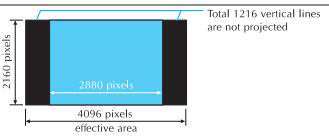
In case of [3996]-horizontal pixels (B) Vista Vision (1.85:1) Projection – 3996(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.540541	2440	2710	3250	3790	4330	4870	5410	6490	7570
Diagonal Screen Size [SS] SS = W x 1.136743	4110 (161.8)	4570 (179.9)	5480 (215.7)	6390 (251.6)	7310 (287.8)	8220 (323.6)	9130 (359.4)	10960 (431.5)	12780 (503.1)
Throwing distance [min.] = W x 3.892127 – 122.8	17400	19340	23230	27130	31020	34910	38800	46590	54370
Throwing distance [max.] = W x 7.154213 – 169.0	32020	35600	42750	49910	57060	64210	71370	85680	99980



In case of [2880]-horizontal pixels (A) 4:3 Projection – 2880(H) x 2160(V) pixels Unit=mm (inches)

Screen width [W]	4500	5000	6000	7000	8000	9000	10000	12000	14000
Required screen height [H] H = W x 0.750000	3380	3750	4500	5250	6000	6750	7500	9000	10500
Diagonal Screen Size [SS] SS = W x 1.250000	5630 (221.7)	6250 (246.1)	7500 (295.3)	8750 (344.5)	10000 (393.7)	11250 (443)	12500 (492.1)	15000 (590.6)	17500 (689)
Throwing distance [min.] = W x 5.400327 – 122.8	24180	26880	32280	37680	43080	48490	53890	64690	75490
Throwing distance [max.] = W x 9.926471 – 169.0	44500	49460	59380	69310	79240	89160	99090	118940	138800



*Effective area of projector LCD device